no effect on the clinical picture and was discontinued because of severe toxic manifestations. Intramuscular administration of citrated whole blood from a donor who had been immunized against type alpha and type gamma streptococci was followed by a rapid improvement, and it is felt that the favorable outcome in this case must be ascribed to the effect of the immune blood. Doctor Krueger, from whom the blood was obtained, informs me that blood from donors (whom he immunizes against the various organisms by injecting undenatured bacterial antigens) has been used in the treatment of approximately five hundred cases of acute infection of various sorts. It is his opinion that the intramuscular injection of the blood establishes a depot in the tissues from which specific antibodies are absorbed, with resultant enhancement of the phagocytic activity of the reticuloendothelial system. Nearly always there is a prompt rise in the white-cell count (in this case from 23,000 to 40,000) and a diminution in toxemia. In general, the earlier the blood was administered the better have been the results.

400 Wakefield Building.

TRAUMATIC RUPTURE OF THE LIVER

REPORT OF CASE

By MAX E. PICKWORTH, M. D.
San Jose

RUPTURE of the liver is one of the rarely reported surgical emergencies. Most patients so afflicted die without benefit of surgery, and are included in the general group of "death due to shock." Shock is no contraindication to exploration; in fact, continued shock should be an indication to operate.

Hemorrhage is the outstanding danger of hepatic trauma. Control of that hemorrhage has to be the primary object of treatment. We know that spontaneous hemostasis of ruptured liver is rare. There have been numerous methods, combinations of methods, and modifications devised for hemostasis, and from this fact no one method probably can be applied to all cases. In these emergencies one has to use whatever is at hand. We must bear in mind that, if hemorrhage can be controlled for seventy-two hours, we have more than likely accomplished our purpose. The methods more commonly available for application, such as suturing of the liver with or without the additional support of strips from the abdominal wall or omentum and packing with gauze, are generally sufficient. However, most cases reported, in which packing and drainage were used, have had complications of abscess or secondary hemorrhage.

Adjuncts to the above would be compression of the portal vein, as employed by Pringle in 1908, for temporary control of hemorrhage. McDill, in 1912, clamped the vessels of the gastrohepatic omentum with an enterostomy clamp, and he states that procedures can thus probably be made entirely bloodless for eight to ten minutes with safety.

The liver's large size, its friability and its fixed position render it particularly vulnerable to external force. Anteroposterior compression is probably the most common cause of laceration.

According to Moynihan, subcutaneous wounds of the liver are of three kinds:

1. Rupture of liver with laceration of Glissons' capsule;
2. Separation of the capsule with subcapsular hemorrhage; and
3. Central rupture, leading to hematoma, and thence to abscess or cyst formation.

He further states that the right lobe is injured six times as often as the left.

When traumatized the liver has a tendency to split or crack in a stellate manner, with massive hemorrhage, and spilling of varying amounts of bile. These are the cases belonging to the first class, and the ones in which mortality is high unless operated within the first few hours. Those cases coming to operation several days following injury belong to the second and third classes.

Robertson and Graham report a case of subcapsular hemorrhage operated on twenty-seven days following injury. Christopher reports a case of primary subcapsular hemorrhage, with spontaneous rupture of the capsule on the operating table, within twenty-four hours of injury.

Frequently other abdominal viscera or thoracic organs and diaphragm are also injured, thus producing serious complications which may mask symptoms referable to the injured liver. Even in these cases much is to be hoped for by immediate and adequate surgery. This is borne out by the unusual and dramatic case reported by Gemmil and Martin. The patient, a woman of twenty-six, was injured by an automobile. There was evisceration of the intestine, severe laceration of the liver, and torn right kidney. The intestine was returned to the abdomen, and the liver and kidney were sutured, followed by an uneventful recovery in forty-six days.

Mortality figures for rupture of the liver run as high as 80 per cent in operated cases. Factors influencing mortality:

1. Acute anemia and shock.
2. Injuries to other viscera.
3. Paralytic ileus due to trauma or bile leakage.
4. Failure to estimate the gravity of the situation when first seen. Occasionally a trivial trauma may cause rupture, or severe hepatic injury may be accompanied by relatively insignificant primary symptoms, as in the case reported by Robin. A man fell across a ditch, striking his abdomen. He had only slight discomfort, walked to his car and was driven home. More than twelve hours later he was found to be bleeding severely from hepatic rupture. (This case may have been similar to the one reported by Christopher).
5. Failure to give the utmost attention to postoperative care.

The diagnosis of rupture of the liver may be difficult. A history of injury in the hepatic region always should make one suspect rupture of the liver. The differential diagnosis between visceral injury and simple shock or simple injury to the abdominal wall must be made. Repeated blood counts will aid greatly in this differentiation.

SYMPTOMS

1. Pain in right upper quadrant or generalized, with pain referred to right shoulder or back.

2. Board-like rigidity and exquisite tenderness over the involved area, as a rule.

3. Increase in liver dullness.

4. Dullness in flanks, if there is marked hemorrhage.

5. Shock due to the impact or due to flooding of peritoneal cavity with blood and bile.

6. Sharp rise in white blood cells and fall in red blood cells.

7. Jaundice: This is of relatively late development, coming on two to three days after injury.

TREATMENT

The treatment of diagnosticated or strongly suspected rupture of the liver is immediate laparotomy with repair of the lesion. Shock is not a contraindication to immediate operation. As Deaver states, it is safer to subject the patient to the added burden of an operation than to the added burden of continued hemorrhage. Transfusions before, during, and after operation are advisable where there has been considerable blood loss. Autotransfusions have been used, but are indicated only if blood cannot be obtained from other sources; and then care must be taken to ascertain that there is no injury to hollow viscera.

Postoperative measures are aimed at treatment of the damaged liver by glucose intravenously, the treatment of the anemia, and the prevention or treatment of ileus and distention by adequate measures. All aid in the reduction of mortality in these cases.

REPORT OF CASE

A. S., age 21, admitted to hospital at 7:45 p. m., following an automobile accident on July 20, 1938. I first saw the patient at 9 p. m., at which time he was complaining of severe pain in abdomen and right shoulder. Examination revealed a well-developed and nourished white male, obviously in shock. Skin was cold and clammy.

Head: Abrasion on right side of face; laceration of chin.

Lungs: Clear to auscultation and percussion.

Cardiovascular: Heart rate regular. Tones poor. Blood pressure, 65/0. Respiration 40. Pulse not discernible.

Abdomen: Somewhat distended. Rigid in upper abdomen. Dullness in both flanks. Slight palpation or percussion over right upper quadrant caused severe pain.

Diagnosis.—Shock; probable ruptured liver.

Treatment.—Immediately instituted for shock. One thousand cubic centimeters of 10 per cent glucose in saline was given by vein. Blood pressure came up to 130/70 and pulse to 95. Red blood count revealed 2,500,000; 40 per cent hemoglobin; 22,900 white blood cells. The patient was typed for transfusion. The improvement was of short duration. The pulse and respiration became more rapid and weak. Blood pressure dropped again to 70/0. By midnight two donors had been found, so the patient was taken to surgery and transfused with 500 cubic centimeters of whole blood. Immediately, and without removal of the patient from the cart, he was anesthetized and prepared for exploratory laparotomy.

Operation.—Upper right rectus incision was made, and upon opening the peritoneum a large quantity of blood gushed forth. There was approximately 1000 to 1500 cubic centimeters of blood in the peritoneal cavity. The stomach and intestines were packed off, and exploration revealed two rents in the right lobe of the liver. One rent extended from the margin of the liver down to the cystic duct, the other rent was lateral to the first and only about four centimeters in length. Both were bleeding profusely. Both rents were closed with overlapping mattress sutures of plain No. 1. catgut, and the bleeding controlled. The patient's respiration had dropped to about 10 per minute, and general condition was so poor that immediate closure of abdomen by interrupted through and through sutures of No. 4 dermal was effected. Blood pressure during operation went from 100/98 to 62/40. Respiration ranged from 40 to 10.

Ten per cent glucose in saline continuously by vein was started immediately after operation. Condition remained precarious for twelve hours, but, finally, blood pressure came up to 110/70. On the afternoon following operation it was deemed advisable to transfuse the patient with 500 cubic centimeters of citrated blood. Red blood count, following this transfusion, was 3,250,000; hemoglobin 61 per cent. The temperature curve went up to 104.6, pulse 172, respiration 40, during the first twenty-four hours. On June 22, 1938, continuous gastric drainage was instituted because of ileus. This was relieved in twenty-four hours. On June 23, 1938, blood count revealed 2,600,000 red blood cells, 61 per cent hemoglobin, 7,200 white blood cells, so another 500 cubic centimeters transfusion was given. The patient continued to complain of pain in the left lower chest and left shoulder, and had a temperature of 102 till July 11, 1938, which was eighteen days postoperative. However, x-ray of the chest revealed no pathology, and diaphragm was at normal level. Shifting dullness in abdomen was to be found until July 15, 1938. The patient was discharged from the hospital on July 19, 1938, still jaundiced, but otherwise quite well, twenty-eight days postoperative. When last seen, on November 20, 1938, the patient was well and had been back on his regular job for a little over two months. His wound was well healed, without evidence of any hernia at that time.

COMMENT

More cases of this type should be explored. Shock, and what appears to be a hopeless situation, should not deter one from giving a patient the benefit of surgery. Careful attention to postoperative treatment undoubtedly plays a big rôle in the recovery of these patients.

Medico-Dental Building.

RECTAL FOREIGN BODY

By DUDLEY SMITH, M. D.
San Francisco

THE accompanying photograph, "believe it or not," shows an extraordinary foreign body removed from the rectum. It consists of a piece of garden hose, eleven inches long, and an inch and a quarter in diameter, the distal end of which had been split up six inches, a longitudinal strip removed, and it was then bound tightly with cord to close the lumen. A yellow toy balloon, filled with water, had been drawn over the hose, the neck being tightly tied to prevent escape of the water. The balloon had on it a picture of the Golden Gate Bridge.

REPORT OF CASE

On the morning of July 26, 1938, the patient, a man, age 59, stated he was using the instrument *"to massage the prostate"*; and as he stepped out of the bathtub he fell on the edge of the tub, forcing the entire gadget into the rectum. Eight hours later I was consulted, and could just reach the hose by digital examination. It was easy to remove by grasping it with a Kocher hemostat. Although the upper end had entered the gut fourteen inches, no perforation resulted—probably due to the soft, smooth water-filled tip of the balloon.

This is, no doubt, the first time the Golden Gate Bridge has been pulled out of the rectum!

450 Sutter Street.

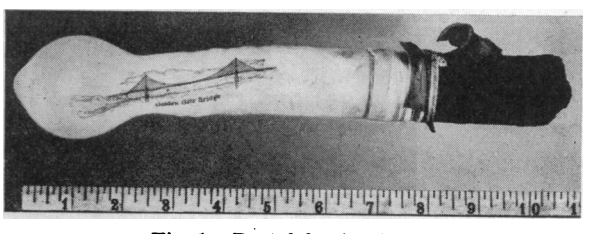

Fig. 1.—Rectal foreign body.